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Education Bureau

Territory-wide System Assessment 2012

Secondary 3

Mathematics

QUESTION BOOKLET

INSTRUCTIONS

1. There are 51 questions in this paper.
2. The time allowed is 65 minutes.
3. Answer ALL questions in the separate ANSWER BOOKLET.
4. The use of HKEAA approved calculators is permitted.
5. Unless otherwise specified, numerical answers should be either exact or correct to 3 significant figures.
6. Rough work should be done on the rough work sheet provided.
7. The diagrams in this paper are not necessarily drawn to scale.

FORMULAS FOR REFERENCE

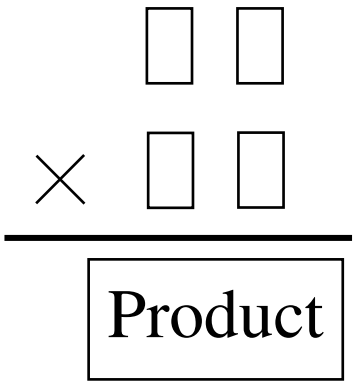
Sector	Arc length	=	$2\pi r \times \frac{\theta}{360^\circ}$
	Area	=	$\pi r^2 \times \frac{\theta}{360^\circ}$
Sphere	Surface area	=	$4\pi r^2$
	Volume	=	$\frac{4}{3}\pi r^3$
Cylinder	Curved surface area	=	$2\pi rh$
	Volume	=	$\pi r^2 h$
Cone	Curved surface area	=	πrl
	Volume	=	$\frac{1}{3}\pi r^2 h$
Prism	Volume	=	base area × height
Pyramid	Volume	=	$\frac{1}{3}$ × base area × height

SECTION A: Choose the best answer for each question.
You should mark all your answers in the ANSWER BOOKLET.

1. Calculate $\frac{6-(-6)}{-6}$.

A. -6
B. -2
C. 5
D. 6

2. Which of the following numbers **CANNOT** be the product of 2 two-digit numbers?



A. 187
B. 1849
C. 6351
D. 10201

3. $2.03\times10^{-5}=$

A. 0.000 203.
B. 0.000 020 3.
C. 0.000 002 03.
D. 0.000 000 203.

4. $(-2)^{-2} =$

A. $\frac{1}{4}$.

B. $-\frac{1}{4}$.

C. 4.

D. -4.

5. Charles mailed a parcel in a post office. He put 7 stamps on it which cost \$48.6 in total. There were x \$2.4 stamps and the rest were \$13 stamps. Which of the following equations can be used to find the value of x?

A. $2.4(7)+13x=48.6$

B. $2.4x+13(7)=48.6$

C. $2.4x+13(7-x)=48.6$

D. $2.4(7-x)+13x=48.6$

6. Which of the following points lie on the straight line $x-5=0$?

$P(5\ ,\ 0)\ ,\quad Q(10\ ,\ 5)\ ,\quad R(0\ ,\ 5)\ ,\quad S(5\ ,\ 10)$

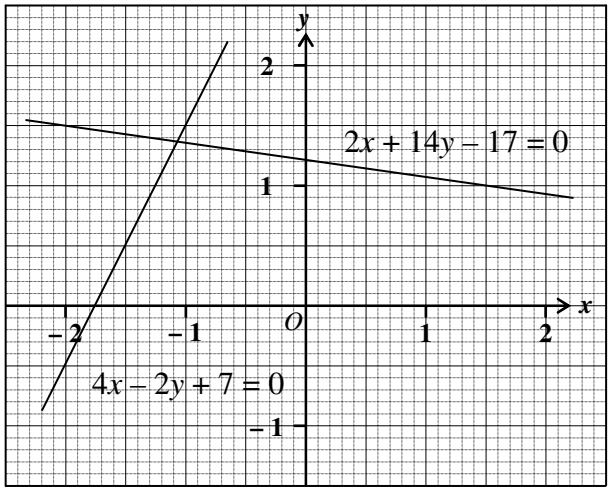
A. P and Q

B. R and S

C. P and S

D. Q and R

7.



The above figure shows the graphs of $2x+14y-17=0$ and $4x-2y+7=0$.

Solve $\begin{cases} 2x+14y-17=0 \\ 4x-2y+7=0 \end{cases}$ graphically.

A. The approximate solution is (– 1.2 , 1.5).

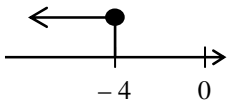
B. The approximate solution is (– 1.1 , 1.4).

C. The exact solution is (– 1.2 , 1.5).

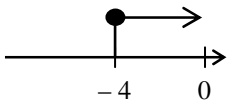
D. The exact solution is (– 1.1 , 1.4).

8. Which of the following diagrams represents $x < -4$?

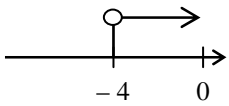
A.



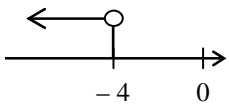
B.



C.



D.

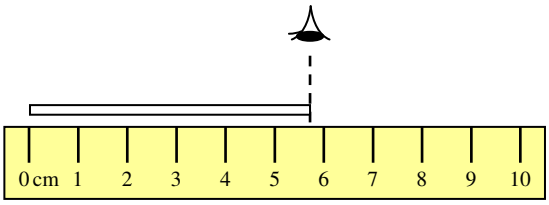


9. The thickness of a dictionary is 44 mm (correct to the nearest mm). Which of the following could be its actual thickness?

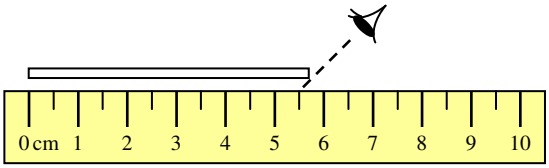
A. 43.0 mm
B. 43.4 mm
C. 44.4 mm
D. 44.8 mm

10. Benny wants to measure the length of a metal rod. Among the following methods, which one can give a more accurate reading of the length?

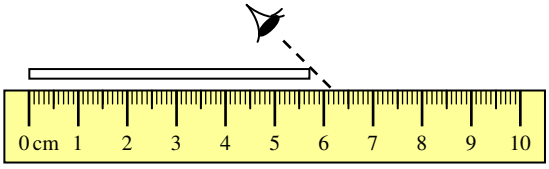
A.



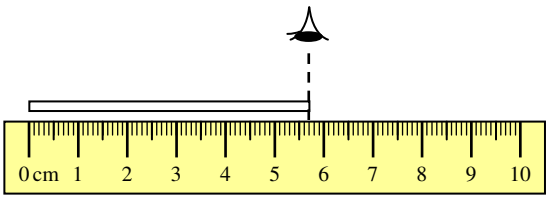
B.



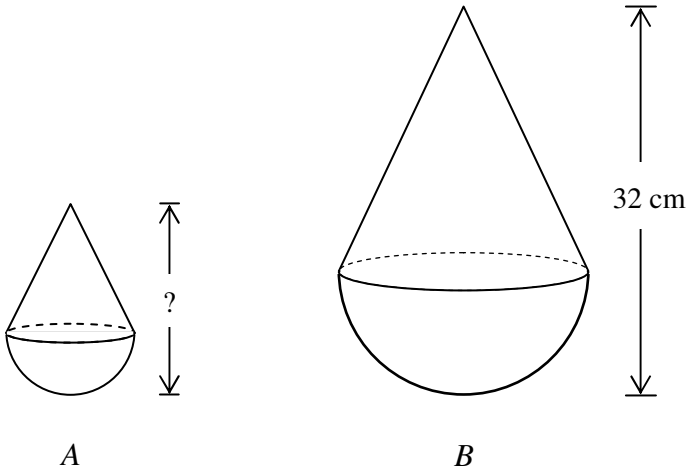
C.



D.

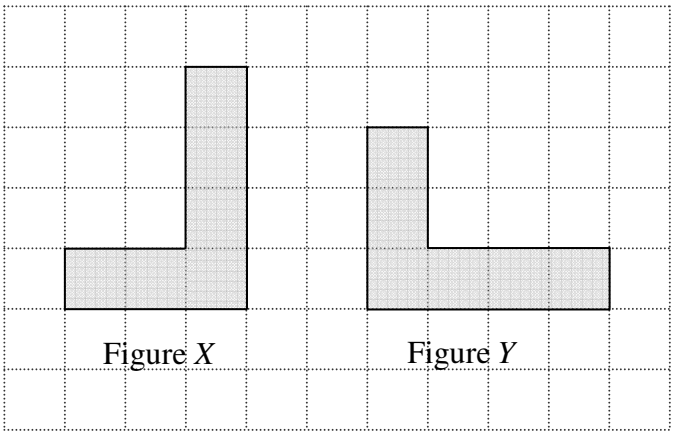


11. In the figure, A and B are two similar solids. The volumes of A and B are V cm^3 and $8V$ cm^3 respectively. If the height of B is 32 cm, find the height of A.



A. 16 cm
B. 8 cm
C. 4 cm
D. 2 cm

12. Figure X is changed to Figure Y after a single transformation.



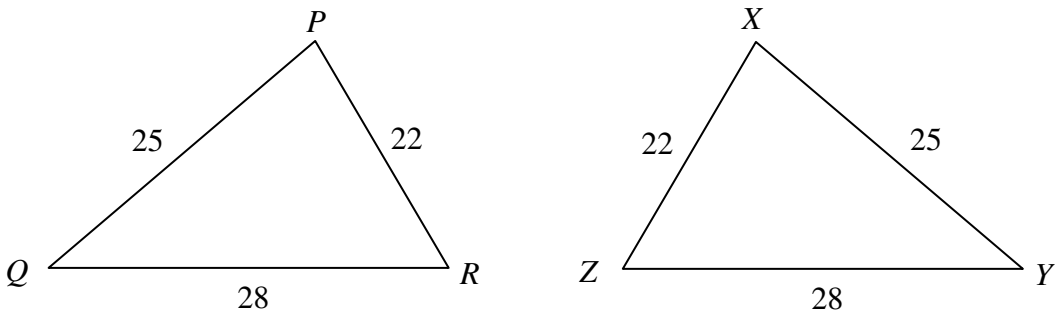
The transformation is

A. rotation.
B. reflection.
C. enlargement.
D. translation.

13. Which of the following descriptions of cubes is **INCORRECT**?

A. All the faces of a cube are squares of the same size.
B. All the edges of a cube are equal in length.
C. All cuboids are cubes.
D. All cubes are regular polyhedra.

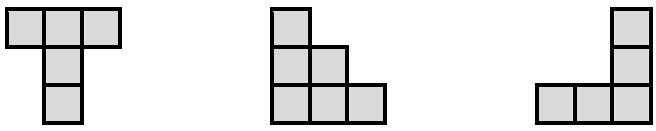
14.



According to the figures above, which of the following is correct?

A. $\triangle PQR \cong \triangle XZY$ (3 sides proportional)
B. $\triangle PQR \cong \triangle XYZ$ (SSS)
C. $\triangle PQR \cong \triangle XYZ$ (RHS)
D. $\triangle PQR \cong \triangle XZY$ (AAA)

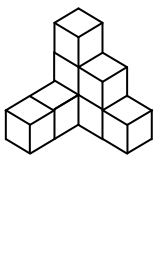
15. The figures below show the 2-D representations of a solid from various views:



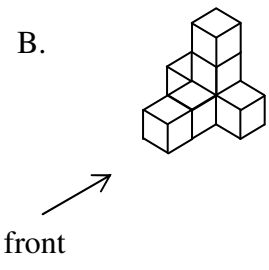
top view front view side view

Which of the following could be the solid?

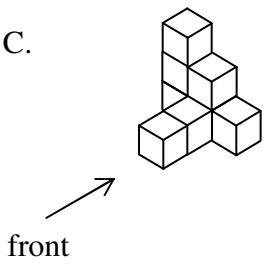
A.



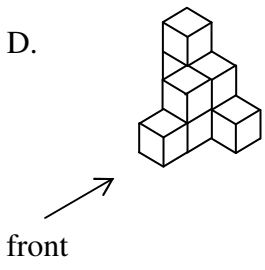
B.



C.

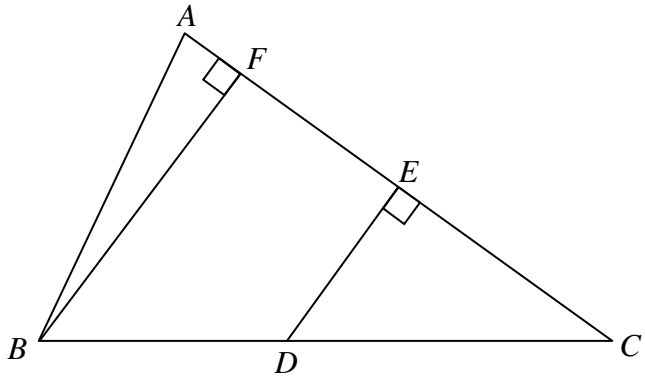


D.



16. In $\triangle ABC$, $AE = EC$, $BF \perp AC$ and $DE \perp AC$. Which of the following is a perpendicular bisector of $\triangle ABC$?

A. BF
B. DE
C. AE
D. AF



17. If $A(5\ ,\ -9)$ and $B(-7\ ,\ 2)$ are two points in a rectangular coordinate plane, the distance between A and B is

A. $\sqrt{[5-(-9)]+[-7-(2)]}$ units.

B. $\sqrt{[5-(-7)]+[-9-(2)]}$ units.

C. $\sqrt{[5-(-9)]^2+[-7-(2)]^2}$ units.

D. $\sqrt{[5-(-7)]^2+[-9-(2)]^2}$ units.

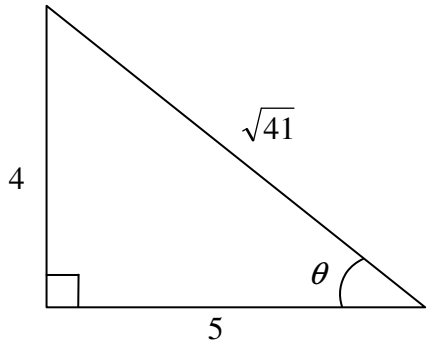
18. Find the value of $\sin\theta$ in the figure.

A. $\frac{\sqrt{41}}{4}$

B. $\frac{4}{5}$

C. $\frac{5}{\sqrt{41}}$

D. $\frac{4}{\sqrt{41}}$



Go on to the next page

19. A company is developing a new model of LED monitor. In the testing process, the company wants to find out the average lifetime of this new model. Which of the following is the most suitable method to collect the data?

A. Carry out experiments on this model
B. Search for the lifetime of monitors of other brands
C. Interview citizens randomly by phone
D. Conduct a customer survey using questionnaires

20. Determine whether each of the following data is discrete or continuous.

(i) The class numbers of 3B students
(ii) The weights of 3B students

	(i)	(ii)
A.	Discrete data	Continuous data
B.	Discrete data	Discrete data
C.	Continuous data	Discrete data
D.	Continuous data	Continuous data

SECTION B: Write ALL the answers in the ANSWER BOOKLET.
Working need not be shown.

21. William uses a positive number to represent an amount deposited in a bank and a negative number to represent an amount withdrawn from the bank. Use a directed number to represent the deposit or withdrawal.

(i) A withdrawal of 900 dollars.
(ii) A deposit of 1500 dollars.

22. (a) Calculate $-4-2(-3)$.
(b) Calculate $-4+2(-3)$.

23. Fanny deposits \$6 000 in a bank. The simple interest rate is 2.5% p.a. How long will it take Fanny to receive an amount of \$6 600?

24. There are x chickens and 5 pigs in a farm. Chickens and pigs have y feet in total. Write down an equation to represent the relationship between x and y.

25. The following figures are formed by 2, 4, 8 and 16 circles respectively.

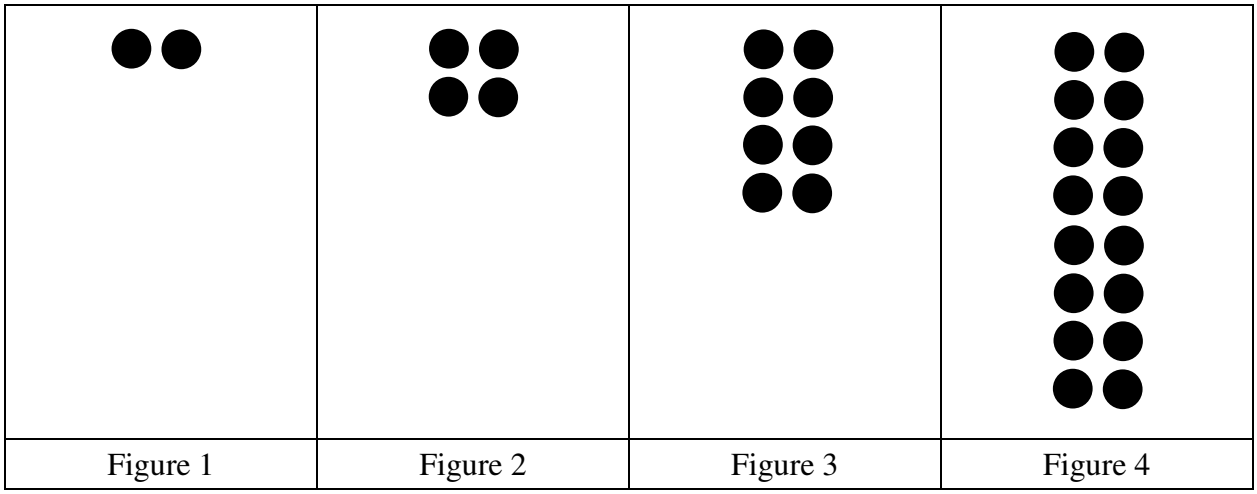


Figure 1	Figure 2	Figure 3	Figure 4

According to the above pattern, Figure n is formed by _____ circles.

26. Expand $x(2x^3+4x-1)$.

27. Factorize $4y^4 + 8y^2$.

28. Factorize $2x^2 - 7x + 6$.

29. Expand $(x + 6)(x - 6)$.

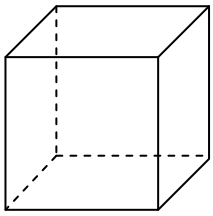
30. Consider the formula $v = u + at$.
If $v = 36$, $u = 12$ and $a = 6$, find the value of t.

31. In the **ANSWER BOOKLET**, fill in the boxes with $>$ or $<$ to express the relations between the numbers.

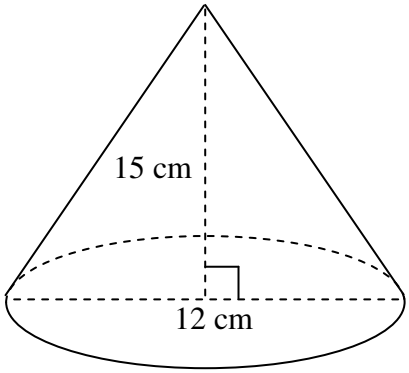
i. -5.5 ☐ -5.7

ii. -0.5 ☐ -0.05

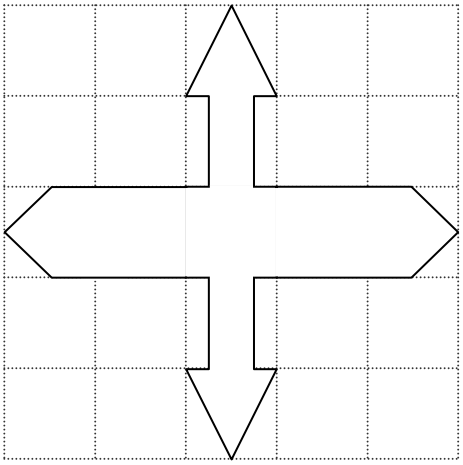
32. The figure shows a solid cube of side 3 cm. Find the total surface area of the cube.



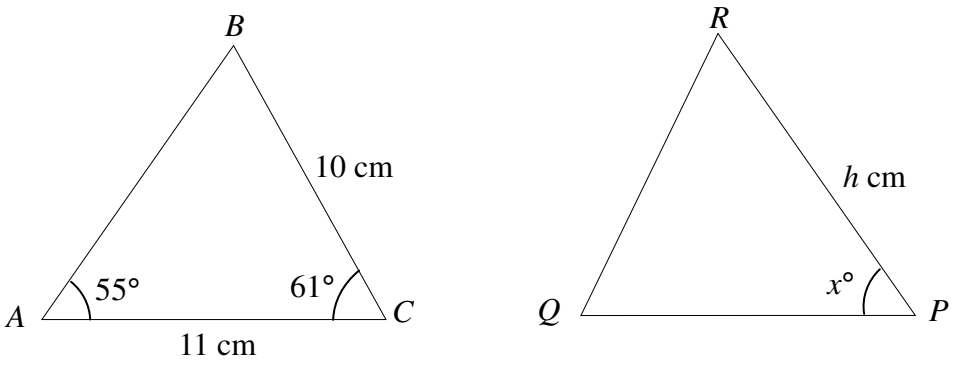
33. The figure shows a right circular cone with a height of 15 cm and base diameter of 12 cm. Find the volume of the cone. Express the answer in terms of π.



34. Draw **ALL** axes of symmetry of the following figure in the **ANSWER BOOKLET**.



35.

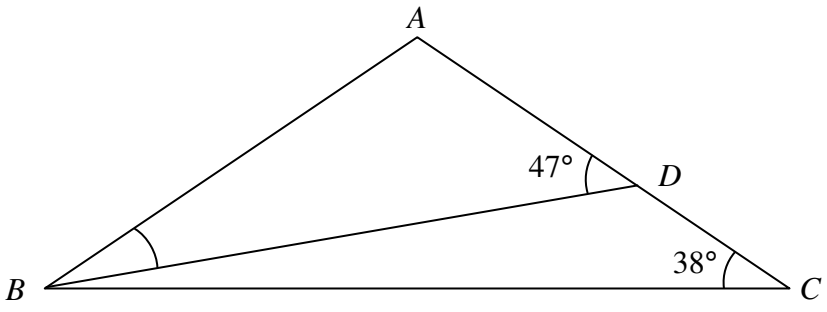


In the figure, $\triangle ABC \cong \triangle PQR$. Find

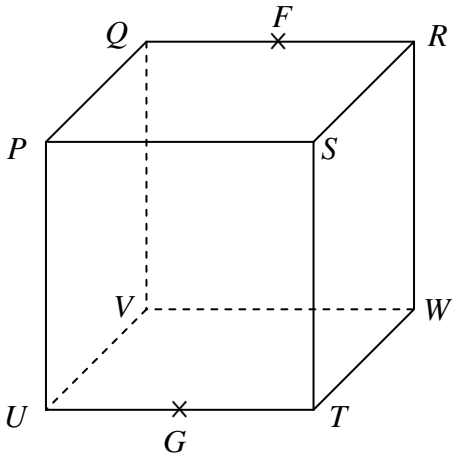
(a) the value of x,

(b) the value of h.

36. In the figure, $AB = AC$, $\angle ACB = 38°$ and $\angle ADB = 47°$. Find $\angle ABD$.

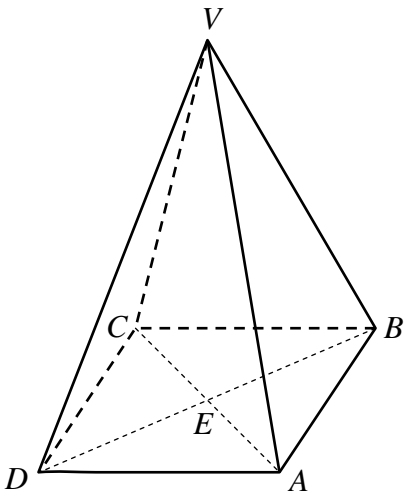


37. The figure shows a cube $PQRSTUVW$. F and G are the mid-points of QR and UT respectively. Which of the following are axes of rotational symmetry of the cube?
(**MORE THAN** one answer)

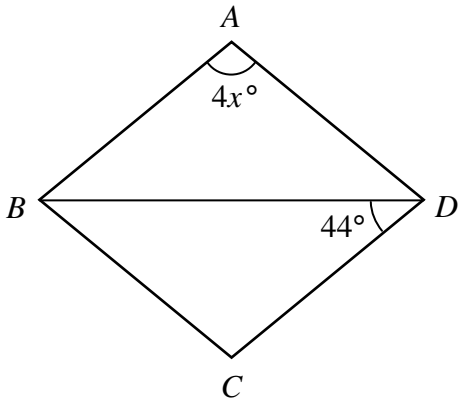


(I) FG
(II) QT
(III) SW
(IV) UV

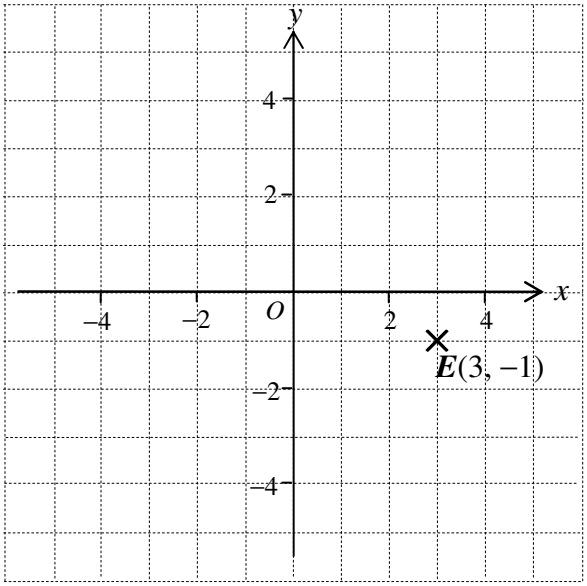
38. $VABCD$ is a right pyramid with a square base $ABCD$. $ABCD$ is a horizontal plane. E is the point of intersection of AC and BD. Name the angle between the line VA and the plane $ABCD$.



39. In the figure, $ABCD$ is a rhombus. Find the value of x.



40. $\boldsymbol{E}(3\ ,-1)$ is reflected along the y-axis to $\boldsymbol{E'}$. Find the coordinates of $\boldsymbol{E'}$.



41. The following table shows the time for 50 teams of students to solve all the problems in a Mathematics competition.

Time (min)	8 – 10	11 – 13	14 – 16	17 – 19	20 – 22
Frequency	4	13	22	9	2

Find the modal class of the time for 50 teams of students to solve all the problems in the Mathematics competition.

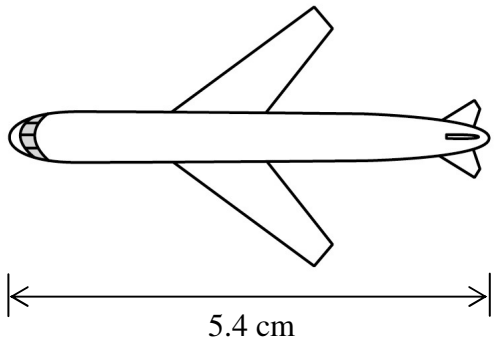
42. There are 1 blue pen, 1 red pen and 1 green pen inside the pencil case of Sally. There are 1 blue pen and 1 red pen inside the pencil case of Candy. If a pen is drawn from **EACH** pencil case at random, find the probability of getting 2 blue pens.

SECTION C: All working must be clearly shown.
Write the mathematical expressions, answers and statements/conclusions in the spaces provided in the ANSWER BOOKLET.

43. Ivan sells a notebook computer at a loss of 15%. If the loss is \$930, find the cost price of the notebook computer.

44. Doris deposits \$62 500 in a bank. The interest rate is 4% p.a. compounded yearly. Find the amount she will receive after 3 years.

45. The figure shows a scale drawing of a plane with a scale of 1 : 1 500. The length of the plane in the figure is 5.4 cm. Find the actual length in m of the plane.

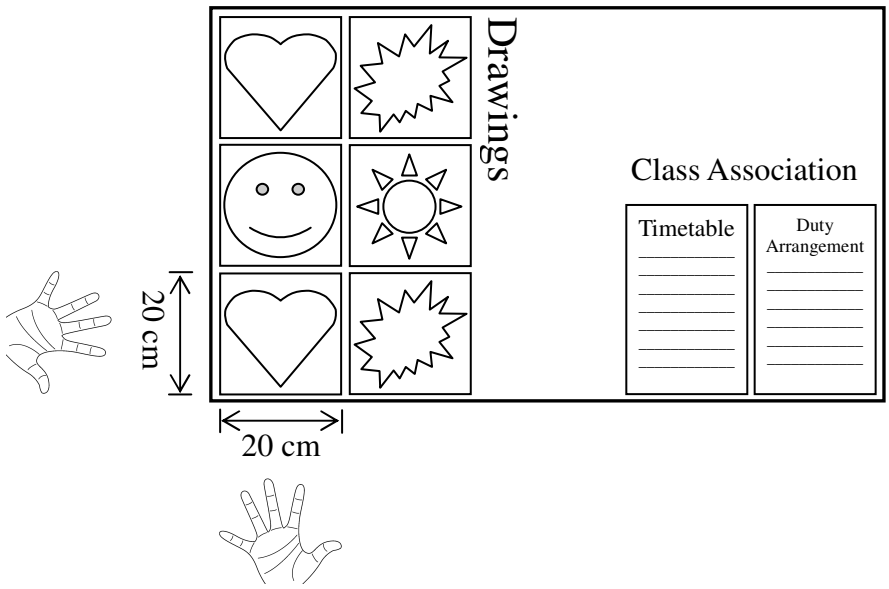


46. Complete the table for the equation $y = 4$ in the **ANSWER BOOKLET**.

x	-3	0	3
y	4		

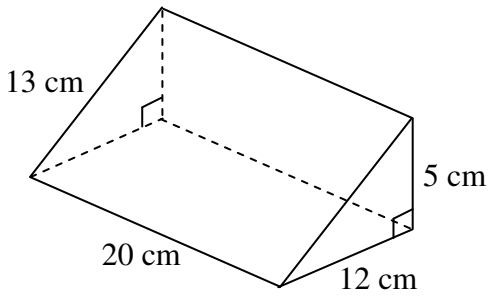
According to the table, draw the graph of this equation on the rectangular coordinate plane given in the **ANSWER BOOKLET**.

47.

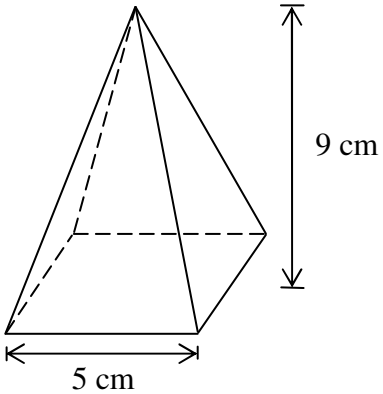


The figure shows a notice board and a boy's palm. The hand span of the boy is about 20 cm. Estimate the area of the notice board and explain your estimation method.

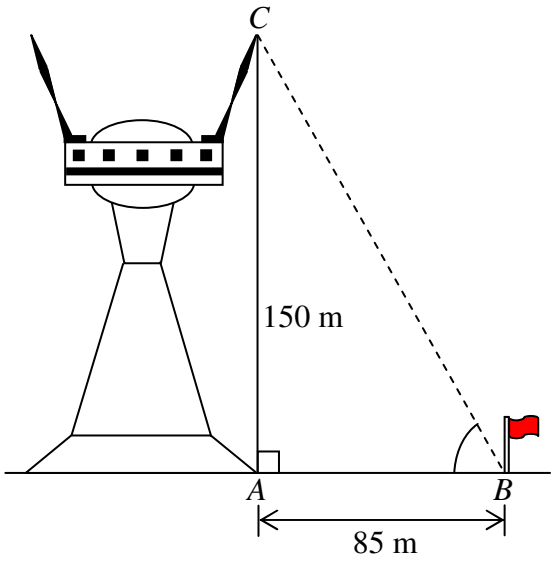
48. In the figure, the base of the prism is a right-angled triangle. Find the volume of the prism.



49. The height of the pyramid in the figure is 9 cm. Its base is a square of side 5 cm. Find the volume of the pyramid.

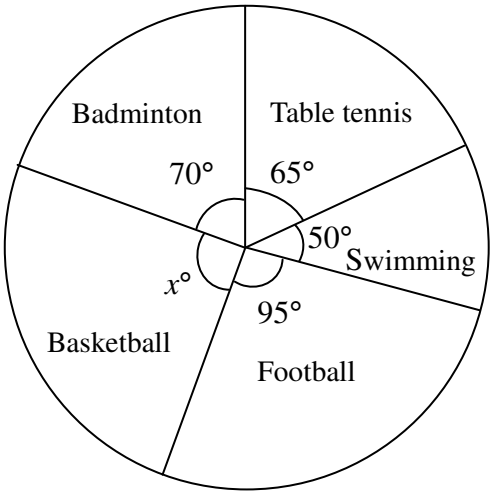


50. In the figure, the observatory tower is 150 m high. A flagpole is located at point B which is 85 m away from the bottom A of the tower. Find the angle of elevation of the top C of the tower from B. Correct the answer to 3 significant figures.



51. The pie chart below shows favorite sports of Secondary 3 students of a school.

Favorite sports of Secondary 3 students of a school



According to the above diagram, answer the following questions.

(a) Find the value of x.
(b) In Secondary 3, there are 20 students whose favorite sport is swimming. How many students are there in Secondary 3?
(c) Find the number of students whose favorite sport is football.

END OF PAPER

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